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Engineering Report
Water and Sanitary Sewer

For

385 Broadway Apartments
Saratoga Springs, New York

PB #18.XXX

Prepared For:

385 Broadway LLC
1732 Western Avenue
Albany, NY 12203

Prepared By:

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PROJECT DESCRIPTION

The project proposes a mixed-use commercial/residential building at 385 Broadway in the City of Saratoga Springs, NY. Vehicular access to the site is from Division Street via a 20-foot-wide access easement. The site is adjacent to the Saratoga Stadium Sports Bar and just north of the Druthers' Brewing Company Restaurant.

The building is proposed to have 72 dwelling units and approximately 12,000 gross square feet of retail space. There will be a mix of micro, one and two-bedroom apartments in the building. For this study, the micro units are treated as one-bedrooms. There will be 12 two-bedroom units and 60 one-bedroom or micro units for a total of 84 bedrooms.

EXISTING CONDITIONS

Water Distribution – A 16-inch ductile iron water main is present along the west side of Broadway in front of the site. There is also an 8-inch main in Broadway but that main is located on the east side of the street. Historical hydrant flow test data in this area indicate static pressures of 76 and 88 psi. Residual pressures of between 66 and 84 psi were recorded with the hydrants flowing at approximately 1,250 gallons per minute. The theoretical available fire flow at 20 psi is approximately 4,000 gallons per minute. See Attachment A for hydrant flow test information.

Sanitary Sewer – An existing 12-inch vitrified clay sanitary sewer main runs along the west side of Broadway and flows to the south, then east down Phila Street. The City gravity collection system eventually takes the wastewater to the Saratoga County Sewer District Pump Station at High Rock Avenue and Warren Street. From there the wastewater is pumped to County trunk lines and the treatment plant in Mechanicville.

SEWER AND WATER USAGE

The table below provides information on the anticipated average potable water use and wastewater flow rates for the project. Water use and wastewater flow are estimated to be equal for this study.

Table - Average Daily Flow (ADF)

Retail: (12,000 square feet) x (0.10 gpd/sf)[1] =	1,200 gpd
Apartments: (84 bedrooms) x (110 gpd/ bedroom)[1] =	9,240 gpd
Total =	10,440 gpd

Summary of Design Flows

Average daily flow for wastewater is estimated to be 9.7 gallons per minute (gpm) based on an 18-hour day. Estimated peak hourly flow is 40.7 gpm (4.20 x average).[2]

Average daily demand for water is estimated to be approximately equal to the wastewater flow or 9.7 gpm. Instantaneous peak demand is estimated at 252 gpm based on the table below:

Commercial: (12,000 square feet) x (0.06 gpm/sf)[3] =	72 gpm
Apartments: (72 residences) x (2.5 gpm/residence)[3] =	180 gpm
Total =	252 gpm

For the purposes of input into the City of Saratoga Springs water model, we offer the following estimated water demands for the project:

- Average Day Demand is 9.7 gallons per minute (GPM) over the 18-hour period.
- Max Day Demand is 20.4 gallons per minute (GPM) based on twice the average.
- Peak Hourly Flow is 40.7 gallons per minute (GPM) based on 4.20 times the average.
- Fire Flow Demand is 1,000 gallons per minute (GPM) per ISO guidelines.

PROPOSED CONDITIONS

Water Distribution – To service the project, the existing 16-inch ductile-iron water main along the western portion of Broadway will be tapped to provide a 6-inch combined fire protection and domestic service lateral to the building. A combined fire protection and domestic waterline will be brought to the building's mechanical room where the domestic line will tee off and be metered. Fire suppression for the building will be provided by fire sprinklers. The nearest fire hydrant is located on the west side of Broadway immediately in front of the proposed building site.

The minimum needed fire flow (NFF) is 1,000 gallons per minute at 20 psi for a duration of two hours according to the Insurance Services Office Guide for Determination of Needed Fire Flow for residential occupancies protected by an automatic fire sprinkler system. Fire flow test results in the immediate vicinity indicate adequate pressures and flows for this building.

Connections and appurtenances, including tapping sleeves, mechanical joints, tees, isolation valves, thrust blocks, trenching, bedding, as well as testing and disinfection will all be specified in accordance with City of Saratoga Springs standards.

Sanitary Sewer – Sanitary sewer service for the project will be provided by the City of Saratoga Springs 12-inch vitrified clay sewer main along Broadway. A 6-inch PVC sewer service from the proposed building will wye into the existing 12-inch sewer main using a saddle connection. The sewer lateral will maintain a minimum slope of 2%.

All sanitary sewer mains, laterals, manholes and manhole connections will be furnished, installed and tested according to City of Saratoga Springs standards.

1. *From Table B-3, NYSDEC Design Standards for Intermediate Sized Wastewater Treatment Systems, dated March 5, 2014*
2. *From Figure 1, GLUMRB Recommended Standards for Wastewater Facilities*
   Q = (18 + P ½) ÷ (4 + P ½) where P = population in thousands
3. *Table XIV - Ameen Community Water Systems Fifth Edition*

ATTACHMENT A

HYDRANT FLOW TEST DATA

LOCATION	TEST DATE	NOZZLE (IN.)	PITOT (P.S.I.)	NOZZLE COEFF.	GPM	STATIC (P.S.I.)	RESID (P.S.I.)	:ESID. FLOW ' 20 PSI (GPI	TEST RPT.
BROADAY (#268)	07/12/06	2.5	57	0.900	1250	76	66		
BROADWAY (#365) ADEPLHI HOTEI	02/24/16				1325	88	84	PENDING FROM SCOT	
BROADWAY (#375)	10/19/10	2.5	40	0.900		81	78	main size 10	N
BROADWAY (#425)	05/07/10	2.5	18	0.900	633	79	75	2711	Y

ATTACHMENT B

WATER AND SEWER DESIGN CALCULATIONS

385 BROADWAY APARTMENTS
SARATOGA SPRINGS, NEW YORK

CALCULATIONS FOR WATER SUPPLY DEMAND

DETERMINE DAILY AVERAGE AND PEAK HOURLY DEMAND

ESTIMATE MAXIMUM DAILY DEMAND:

RESIDENTIAL:				
NO. OF BEDROOMS		84	EA	
DESIGN FLOW =		110	GPD/EA	(NYSDEC)*
	Qa =	9,240	GPD	
COMMERCIAL/RETAIL:				
BUILDING AREA		12,000	SF	
DESIGN FLOW =		0.1	GPD/SF	(NYSDEC)*
	Qb =	1,200	GPD	
MAX. DAILY DEMAND, Q =		10,440	GPD	(Qa + Qb)
AVG. DAILY DAMAND, Qav =		9.7	GPM	(18 HRS)
MAX. DAILY DAMAND, Qmax =		19	GPM	(TWICE THE AVG.)
POPULATION		140	EA	(10-STATE STDS. PAGE
PEAKING FACTOR, Qp/Qav		4.20		10-5, FIG. 1, BASED ON 75 GPD/PERSON)
PEAK HOURLY DEMAND, Qp =		40.7	GPM	(4.20 x AVG)

* NYSDEC 2014 STANDARDS TABLE B-3 "Typical Per-Unit Loading Rates"

DETERMINE INSTANTANEOUS DEMAND:

COMMERCIAL/RETAIL:				
BUILDING AREA		12,000	SF	
DESIGN FLOW =		0.6	GPM/100 SF	(AMEEN TABLE XV)**
	Qa =	72	GPM	
RESIDENDIAL:				
NO. OF RESIDENCES		72	EA	
INSTANTANEOUS DEMAND =		2.5	GPM/RESIDENCE***	
	Qb =	180	GPM	
TOTAL INSTANTANEOUS		252	GPM	(Qa + Qb)

** AMEEN TABLE XV "Instantaneous Water Demands for Commercial Areas"
(AVERAGE OF SUPER MARKET (1.0) AND OFFICE BUILDING (0.2 GPM/100 SF))
*** AMEEN TABLE XIV "Instantaneous Water Demands for Residential Areas"

385 BROADWAY APARTMENTS
SARATOGA SPRINGS, NEW YORK

CALCULATIONS FOR SANITARY SEWAGE CAPACITY

DETERMINE DAILY AVERAGE AND PEAK HOURLY FLOWS

ESTIMATE MAXIMUM DAILY USAGE:

RESIDENTIAL:

NO. OF BEDROOMS		84	EA	
DESIGN FLOW =		110	GPD/EA	(NYSDEC)
	Qa =	9,240	GPD	

COMMERCIAL/RETAIL:

BUILDING AREA		12,000	SF	
DESIGN FLOW =		0.1	GPD/SF	(NYSDEC)
	Qb =	1,200	GPD	

MAX. DAILY FLOW, Q =	10,440	GPD	(Qa + Qb)
AVG. DAILY FLOW, Qav =	9.7	GPM	(18 HOURS)
POPULATION	140	EA	(10-STATE STDS. PAGE
PEAKING FACTOR, Qp/Qav	4.20		10-5, FIG. 1, BASED ON 75 GPD/PERSON)
PEAK HOURLY FLOW, Qp =	40.7	GPM	(4.20 x AVG)

PEAK FLOW ESTIMATE BY DRAINAGE FIXTURE UNIT (DFU) COUNT:

DETERMINE DFU'S PER TYPICAL UNIT:

QTY	DESCRIPTION	(EACH)	DFU
TYPICAL MICRO OR 1 BR UNIT W/ 1 BATH:			
1	CLOTHES WASHER	2	2
1	KITCHEN SINK	2	2
1	DISHWASHER	3	3
1	LAVATORY	1	1
1	SHOWER	2	2
1	WATER CLOSET	3	3
		TOTAL	13
TYPICAL 2 BR UNIT W/ 2 BATHS:			
1	CLOTHES WASHER	2	2
1	KITCHEN SINK	2	2
1	DISHWASHER	3	3
2	LAVATORY	1	2
2	SHOWER	2	4
2	WATER CLOSET	3	6
		TOTAL	19
TYPICAL 2 BR UNIT W/ 2.5 BATHS:			
1	CLOTHES WASHER	2	2
1	KITCHEN SINK	2	2
1	DISHWASHER	3	3
3	LAVATORY	1	3
2	SHOWER	2	4
3	WATER CLOSET	3	9
		TOTAL	23
RETAIL SPACE:			
1	SERVICE SINK	2	2
1	KITCHEN SINK	2	2
2	LAVATORY	1	2
2	WATER CLOSET	3	6
		TOTAL	12

385 BROADWAY APARTMENTS
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DETERMINE DFU COUNT FOR ENTIRE BUILDING:

QTY	DESCRIPTION	(EACH)	DFU
MICRO UNITS:			
26	MICRO UNITS	13	338
ONE-BEDROOM UNITS:			
34	1 BR UNITS	13	442
TWO-BEDROOMS W/ 2 BATHS:			
1	2 BR UNITS	19	19
TWO-BEDROOMS W/ 2.5 BATHS:			
11	2 BR UNITS	23	253
COMMERCIAL SPACE:			
1	RETAIL	12	12
	TOTAL		1,076

SAY 1,100 DFU

PEAK HOURLY FLOW = 40.7 GPM (4.2 x AVERAGE)
ALT. PEAK FLOW = 210 GPM**(ESTIMATED FOR 1,100 DFU)

* DRAINAGE FIXTURE UNITS FROM NYS BLDG. CODE TABLE 709.1
** APPROXIMATE FLOW BASED ON HUNTER'S CURVE.